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ABSTRACT

This study examined the stability and across time changes on mean scores on eight educational outcomes including cognitive and non-cognitive areas as measured by the Pennsylvania Grade 5 Educational Quality Assessment Inventory. Data, collected on children tested as fifth graders in 1969 and retested in 1971 and 1973, are presented separately for SES and sex groups. Significant SES and sex main effects were observed on a majority of the scales. Direction of change varied with the scale, means increasing with grade on four scales, decreasing for attitude toward school, and increasing then decreasing for three scales. (Author)

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This study examined the stability and across time changes on mean scores on eight educational outcomes including cognitive and non-cognitive areas as measured by the Pennsylvania Grade 5 Educational Quality Assessment Inventory. Data, collected on children tested as 5th graders in 1969 and retested in 1971 and 1973, are presented separately for SES and sex groups. Significant SES and sex main effects were observed on a majority of the scales. Direction of change varied with the scale, means increasing with grade on four scales, decreasing for attitude toward school, and increasing then decreasing for three scales.

INTRODUCTION

In recent years there has been an increased interest in noncognitive areas of education. Goal setting activities by communities and on the state level frequently produce statements of objectives such as the enhancement of a sense of self worth in addition to the more traditional cognitive concerns. Reflecting this dual concern are the 10 goals of quality education adopted in 1965 by Pennsylvania's State Board of Education. Simply worded these goals pertain to (1) self esteem, (2) understanding others, (3) basic skills, (4) interest in school and learning, (5) responsible citizenship, (6) health habits, (7) creative attitude, (8) vocational development, (9) appreciating human accomplishments, and (10) preparing for a changing world. Instruments to measure the 10 goals were developed for grades 5 and 11, and, following a norming operation in 1969, the assessment of school programs began. The principle intent of conducting a longitudinal study of the 5th grade instrument package was to determine the extent and direction of growth in each goal area and the degreé to which pupils maintained their rank order with regard to each area. A sample of 5th grade pupils from schools involved in the 1969 norm phase was selected for follow-up testing at two year intervals. The data gathered at grades 5 and 7 was subjected to a rather extensive analysis. A previous report (Kohr, 1972) dealt with this analysis and provided a detailed description of the data collected, sample selection procedure and the analytic methods used. Data was again collected when these pupils were in the 9th grade and the present report focuses on the growth trend displayed by those areas measured at each grade level.

METHOD

The Pennsylvania Educational Quality Assessment program carried out a norming operation in October of 1969 which involved approximately 19,500 5th graders from 355 elementary schools. The schools had been selected using a stratified sampling plan and were regarded as representative of the state's elementary schools (Hertzog, Campbell and Beers, 1970). In 1971, 20 of these schools were selected for participation in a longitudinal study. Selection was accomplished by taking a systematic sample of the 355 elementary schools which had been rank ordered with respect to an index of school SES. Administrators of these 20 schools identified the junior high schools or middle schools receiving pupils from their elementary school. The recipient schools then provided a list of pupils from the originating school who were currently enrolled in the 7th grade.

Those pupils who were enrolled became candidates for selection into the logitudinal group with one important exception. In cases where two or more junior high schools were recipients of pupils from a given elementary school, only the junior high receiving the largest proportion was permitted to participate. About half of the elementary schools supplied two or more secondary schools. The major recipient school received at least 80 per cent of the children from a given elementary school. This circumstance can be a source of bias if systematic differences exist between the up to 20 per cent who filtered into other schools and those entering the main recipient school. Unfortunately, procedures were never established to determine the amount of potential bias when the "candidate pool" was being developed. Currently, there is no easily available information to bring to bear on the problem. Thirty-five 7th grade pupils were randomly selected via a random numbers table from the candidate pool within each of the 20 junior high schools.

of the 700 pupils, 46 were either no longer enrolled or were absent during the October testing and were lost to the sample. The longitudinal sample consisted of 654 cases tested in 1971. These same pupils were followed up as 9th graders in October of 1973. At this time 89 pupils were no longer in the school system primarily because of moving out of the district. Thus the 1973 longitudinal sample consisted of 565 cases.

Representatives of Longitudinal Sample

In order to estimate the degree of comparability between the 1969 norm sample and the residual longitudinal sample of 1973 several demographic characteristics may be examined. The 1969 norm sample which consisted of approximately 19,500 fifth grade pupils was 49.3% male, 47.2% female with 3.5% not responding. The 1973 longitudinal sample of 565 cases was composed of 48.1% males and 51.7% females with only 0.2% nonresponse. The racial composition of the norm sample was 82.7% white, 10.0% nonwhite with 7.4% nonresponse while the 1973 breakdown was 92.0% white, 7.9% nonwhite and 0.1% nonresponse. Parents educational level may be efficiently described in terms of three categories: (1) some grade school through some high school, (2) a high school graduate with no further training, and (3) some college or post high school technical or business training through a Ph.D. or professional degree. The per cent falling in each category for father's education was 30.1%, 34.7% and 18.5% with 16.7% nonresponse for the 1969 norm sample and 28%, 31.6% and 20.2% with 20.3% nonresponse for the 1973 sample. For the mother's educational level the breakdown was 27.4%, 44.4% and 13.6% with 14.7% nonresponse for the 1969 sample and 23.8%, 41.8% and 14.1% with 20.3% nonresponse for the 1973 sample. The percentage figures for the 1973 longitudinal sample appear to be generally comparable to those of the 1969 norm sample. There would appear to be a slight tendency for the percentage of cases in the lower educational levels to decrease accompanied by a slight increase in the highest category, but the

incidence of nonresponse makes it difficult to draw firm conclusions. Similarly, the incidence of whites appears to be greater in 1973; however, nonresponse in 1969 renders the amount of apparent increase uncertain.

Comparability may also be examined by contrasting the groups with respect to means and standard deviations of each area tested. Regarding the norm group as the population and the longitudinal group as a sample from that population, statistical tests may be applied to determine whether significant departures exist. Summarized in Table 1 are the means and standard deviations for the norm group and the longitudinal sample.

Insert Table 1 about here

A z test was used to determine whether the longitudinal grade 5 means differed significantly from those in the norm group. All tests were nonsignificant with the exception of ATTDSCHL ($z = 3.02$, $p < .01$), CITZNSHP ($z = 3.28$, $p < .01$), and CREATVTY ($z = 3.67$, $p < .01$). To assist in evaluating these significant differences one can examine the "effect size" by forming a ratio of the observed differences to population standard deviation (Cohen, 1969). For these three scales the observed difference is .13, .14 and .16 of a standard deviation. In each instance the effect size is small and can safely be disregarded.

In order to determine whether the longitudinal group variances departed significantly from the norm group, a χ^2 was computed and converted to a z. None of these tests revealed statistically significant differences.

The longitudinal group, in general, appears to be fairly representative of the norm group from which it was derived. A slight, but statistically

significant positive bias in favor of the longitudinal group was observed for the means of three scales. When considering the substantive significance of these deviations, it was concluded that they were small and could reasonably be disregarded. There is, of course, the possibility that the sample differs from the norm group in other important but unmeasured ways.

As will be noted throughout this report, the number of observations on which particular statistics are computed will vary somewhat due to missing data. A frequent practice in survey studies is the isolation of cases with complete data for purposes of analysis. This enables one to have a set of data whose demographic characteristics are known and constant for all variables under analysis and which is, hopefully, not grossly unrepresentative. In the present study missing data are too extensive to indulge in the luxury of analyzing only the subset of complete data.

Definition of Socioeconomic Status

Socioeconomic status was based on father's educational level and partitioned into three categories. Low SES was defined as some grade school up through some high school. Middle SES was defined as a high school graduate but no further training. High SES was defined as some post high school college or training up through a Ph.D. or professional degree. When father's educational level was unavailable, mother's educational level was substituted. The most current educational level data was used in defining a child's SES background.

Description of Scales

Administered in 1969 and 1971 but not in 1973 were instruments measuring verbal and mathematics achievement (goal three) and appreciation

of human accomplsihments (goal nine). The following is a brief description of the instruments used in the measurement of each area. Most of the information was abstracted from Beers (1970) and Burson (1972).

Self Concept (SELFCON) is measured by a 53 item scale which has a possible score range of 53-106. The scale contains 45 items from Coopersmith's (1967) Self Esteem Inventory plus eight items pertaining to "control of environment" obtained from Educational Testing Service. The items reflect the following content areas: (1) control of environment--feelings of confidence in one's ability to fulfill ambitions, (2) self-confidence in personal attributes--feelings of self worth, (3) achieving in school--one's self image in relation to teachers and the school setting, (4) relating to other's--one's relationship with parents and peers.

Understanding differing others (UNDRSTND) is measured by a nine item scale having a possible score range of 9-45. The items pertain to attitudes toward those who differ in race, religion, and economic status. The scale was originally prepared by ETS and modified by EQA.

Attitude toward school (ATTDSCHL) is measured by a 17 item scale with a possible score range of 17-85. The scale contains items developed by ETS and modified by EQA. The items correspond to the following content areas: (1) perception of the school climate--attitudes about teachers, school facilities and course offerings, (2) attitude toward school assignments--opinions about homework, reading, writing and studying, (3) perception of the learning process--attitudes about teacher methods and school in general.

Citizenship (CITZNSHP) is measured by a 44 item scale which has a possible score range of 44-220. The scale was developed by the Pennsylvania Department of Education's Division of Research. The general item content is as follows: (1) Situational ethics--what one would do when confronted with cheating, rule-

breaking, losing or finding articles and helping others, (2) attitudes toward personal responsibility issues--what one's attitude is toward cheating, rule-breaking, etc., (3) concern for democratic principles--opinions on civil rights, freedom of speech, etc., (4) initiative in advocating change--would one criticize established order to effect change.

Health Knowledge (HEALTH) is measured by a 48 item achievement test which has a possible score range of 0-48. Thirty-five items were adapted from the Health and Safety Education Test, Psychometric Affiliates and the remaining 13 items were prepared by Educational Quality Assessment. Items tap knowledge of desirable health habits in areas of personal hygiene, first aid, food and nutrition, alcohol, smoking, drugs and environment hazards.

Creativity (CREATVTY) is measured by a 39 item scale with a possible score range of 39-78. The items, developed by the Division of Research, tap self directedness, flexible and elaborative thinking, willingness to take risks and ease with complex ideas.

Vocational Attitude (VOCATTD) is measured by a 39 item scale with a possible score range of 39-78. The items were adapted from the Crites (1969) Attitude Scale of the Vocational Development Inventory. These items tap maturity of attitudes toward a career choice and the development of educational occupational plans. The relative importance of work and the satisfactions derived are also measured.

Preparing for a changing world (PREPCHNG) is measured by a 29 item scale with a possible score range of 29-145. This scale, developed by EQA contains items which require students to project themselves into the future and indicate their degree of comfort with sweeping changes in societal regulations. Content includes the perceived importance of continued education in coping with change, opinions regarding changes in school, work and travel regulations and attitude toward change in school setting and instructional methods.

RESULTS

Internal Consistency

Presented in Table 2 is the coefficient alpha index of reliability for each scale at each combination of grade level with sex and SES. An increase in internal consistency across grade level should be anticipated as a result of a general "firming up" of attitudes through the pre and middle adolescent years. In general, the data confirms this expectation. The most notable deviation from this pattern occurred for PREPCHNG which showed a downward trend across time. Generally, this same pattern tended to persist within sex and SES groups. The magnitude of the alpha coefficients were highly similar for male and female groups, the largest difference being 10 points observed for UNDRSTND at grade 9. One can note some tendency for internal consistency to become higher as SES level increases, the most distinct instance occurring for CREATVTY. A reversal of this trend was exhibited by the HEALTH scale.

Insert Table 2 about here

Stability

Summarized in Tables 3 and 4 are the across time correlations for each of the eight scales. These correlations are presented for the total sample and for subgroups based on sex and SES. In general, the correlations are of a rather low magnitude with much variance unaccounted for. The total sample stability coefficients for the two year grades 7 to 9 interval (r_{79}) are, with the exception of HEALTH, greater than those for the grade 5 to 7 interval (r_{57}). This finding is consistent with the general tendency of

correlations for adjacent time periods to increase with age during the developmental years. Likewise, stability over the four year grades 5 to 9 interval (r_{59}) tends to be somewhat lower than for the two year intervals.

Insert Tables 3 and 4 about here

Stability coefficients for males and females were found to be similar with a general pattern of somewhat higher correlations for the female group (19 out of 24). Only one correlation was found to differ significantly between sex groups, an effect which is within chance expectancy among a set of 24 stability coefficients. In this single instance r_{57} for HEALTH was significantly higher for the female group ($z = 2.19$, $p < .05$).

A clear pattern of higher correlations across SES levels which could apply to all scales failed to materialize. Statistically, only five of 72 possible comparisons were significant, a result which is within chance expectation. Significant comparisons include a higher correlation for middle SES than low SES for VOCATTD at r_{59} ($z = 2.61$, $p < .01$); the high SES group exceeded the low SES group for ATTDSCHL and VOCATTD, both at r_{59} ($z = 2.37$, $p < .05$, $z = 2.17$, $p < .05$); and the middle SES group exhibited greater stability for CREATVTY at r_{59} ($z = 2.19$, $p < .05$) and for UNDRSTND at r_{79} ($z = 2.23$, $p < .05$).

Analysis of Variance Results

A repeated measure AOV was conducted for each scale in which SES (or sex) served as a between subjects dimension and grade level as a repeated measure or within subjects dimension. Tests were performed to determine whether the independent groups covariance matrices were homogeneous and to test the assumption of homogeneous variances and covariances between repeated

measures (Winer, 1962, pp. 369-371). When this assumption was met the conventional F was computed for the within groups main (grade level) and interaction (Sex x grade or SES x grade) effects, and if statistically significant, appropriate follow-up contrasts in the form of dependent t's were performed. A heterogeneous condition was found to exist for several variables in the SES AOV. Since the development of a pooled error term is questionable when this assumption is violated, a series of pairwise dependent t's were computed which contrasted grade level means at each SES level.

Bartlett's test for homogeneity of variance was also applied to the independent group variances (Guenther, 1965, pp. 135-142). The SES group variances were found to be homogeneous in all analyses as were the variances for sex groups. Following a significant F, pairwise contrasts of individual means were conducted via the general t statistic in which the Behrens Fisher technique was employed along with Welch's solution for df (Kirk, 1968, p. 98). These procedures were incorporated in order to exercise better control over type I errors while maintaining power at an acceptable level in the unequal n case (Games, 1971). A priori probability level of .01 was established for all significance tests which follow. For multiple contrasts the familywise risk of a type I error was maintained at .01 by splitting the significance level of the individual comparisons. Thus, each of the three pairwise comparisons between SES levels were tested at the .0033 (per comparison error rate) level by this approach, which is sometimes referred to as Bonferroni t (Kirk, 1968). As a means of evaluating substantive significance, an estimate of effect size (Cohen, 1969) was obtained for each individual contrast.

Presented in Tables 5 and 6 are the means and standard deviations for each scale across SES, sex and grade levels. Analysis of variance results are summarized in Table 7 for SES nd in Table 10 for sex. Multiple comparisons

among means conducted as a follow-up to the SES AOV include those contrasting SES groups, shown in Table 8 and for comparing grade levels, shown in Table 9. Summarized in Table 11 are the multiple comparisons among grade levels conducted subsequent to the AOV with sex as the between groups variable.

Insert Tables 5-11 about here

The presence of heterogeneous variance-covariance matrices contraindicated the use of the pooled error term for within groups F tests in a number of AOV's. Specifically, these included, for the SES AOV, UNDRSTND and CREATVTY. In the sex AOV this problem occurred for UNDRSTND, ATTDSCHL, CITZNSHP, HEALTH, CREATVTY and VOCATTD. In these instances grade level comparisons were conducted separately for each sex group or for each SES level. In Tables 9 and 11, comparisons based on the total sample (overall) means are denoted by a 'T' after the variable name. Where analyses were conducted for each group separately an 'M' and 'F' signifies male and female and 'L', 'M', and 'H' represents low, middle and high SES. A description of the results for each scale follows.

For the SELFCON scale a significant main effect was obtained for both SES and grade. Progressively higher means were observed across SES levels and the follow-up tests found each pairwise contrast to be statistically significant. Substantively, these increases are minimal except for the low-high contrast which reached a third of a standard deviation. Although the means increased from grade 5 through grade 9, with each pairwise contrast reaching significance, the gains were quite small. In a separate analysis the sex main effect was nonsignificant. None of the analyses revealed significant interactions. These findings suggest that self perceptions of higher SES children tend to be slightly more positive than those of lower SES

children and that there is a general tendency for these perceptions to become slightly more positive across time. There was no evidence that the self concepts of males differed from those of females.

For UNDRSTND an increase in means across SES levels was observed. As a follow-up to a significant SES main effect the high SES mean was found to be significantly greater than the mean scores for the middle and low groups. A significant sex main effect was not found. In both the SES and sex AOV's heterogeneous variance-covariance matrices were detected so grade level comparisons were conducted separately at each SES level and for each sex. Mean scores were found to increase across grade levels within each SES group. All pairwise contrasts between grade levels were statistically significant for the low and middle SES groups whereas only the grade 5-9 contrast reached significance for the high SES group. The greatest effect size occurred in the grade 5-9 interval for all groups, but particularly so for the low SES group where the difference was half a standard deviation. The results for sex groups revealed significant increases from grades 5 to 7 and 5 to 9 for both males and females. In the grade 7 to 9 interval the females also demonstrated a significant gain while the males did not. These findings suggest a somewhat more tolerant attitude toward differing others on the part of the higher SES students. Such a conclusion must be accepted with caution since it is likely that actual contact with substantial numbers of others who differ ethnically and economically may be less for higher SES children than for those in lower SES conditions. In general, the attitudes tended to become more positive across grade levels for all SES groups. Although the overall means did not differ for males and females the pattern of increasing tolerance across grades appears to be greater in a substantive sense for the female group.

Although the means increased slightly across SES level for ATTDSCHL the SES main effect was nonsignificant. The mean scores declined across grade level, each pairwise contrast being statistically significant. Substantively, the grade 5-9 decline was nearly half a standard deviation while only small effects (approximately a quarter standard deviation) were observed at the adjacent time periods. The sex main effect was significant with females having higher mean scores than males, although the difference was only .2 of a standard deviation. In the AOV with sex as the between groups variable heterogeneous variance-covariance matrices were evident and grade level comparisons were carried out separately. These analyses revealed the same pattern of increasingly lower means across grade levels for both sexes. These results indicate that little difference exists among members of different SES groups with respect to expressed attitude toward school. Not surprisingly, females exhibited more positive attitudes than males. Strongly evident was the progressively more negative attitude toward school with advancing grades. This trend was present in all SES groups and for females as well as males.

The CITZNSHP scale reflected a general increase in means with SES. Following a significant SES main effect the individual contrasts revealed a significantly higher mean for the high SES group than for the low SES group. The overall grade 9 mean was found to be significantly lower than the mean score at grades 5 and 7. Significantly higher means were obtained by the female group. Since the AOV with sex was accompanied by heterogeneous variance-covariance matrices separate grade level comparisons were computed for each sex group. The pattern of across grade means for both groups was identical to the general overall pattern, namely a significant decrease during the grade 7 to 9 period. For all groups the effect size of the

grade 7-9 decrease was approximately a quarter of a standard deviation. These results suggest that citizenship, as measured by the present scale is somewhat greater for high SES students. Females also evidenced more positive scores than males. With great consistency all groups displayed more negative responses in the interval following grade 7.

Significant SES and grade main effects were found for HEALTH. The high SES mean was found to be significantly greater than those obtained by the middle and low SES groups. As expected, mean achievement scores increased across grade levels, with each pairwise contrast reaching significance. A significant sex main effect revealed slightly higher achievement by the female grou' however, the difference was only .14 of a standard deviation. The heterogeneity problem again led to separate grade comparisons; however, the pattern of significantly higher scores across grades is strongly evident for males and females. Effect size estimates for grade comparisons were in the moderate to large range. These results, not surprisingly, showed higher achievement in the health knowledge area for children from the highest SES group. Females achieved slightly higher scores than males and, as one should expect, health achievement improved substantially across grade levels for all groups.

The SES main effect was significant for the CREATVTY scale with follow-up contrasts revealing that the middle and high SES groups scored significantly higher than the low SES group. Because of the presence of heterogeneous variance-covariance matrices multiple comparisons among grade levels were conducted separately for each SES group. The same general pattern may be observed for each group, namely that the scores tend to increase from grade 5 to 7 (significantly for the low SES group) or to stay about the same and then decrease from grade 7 to 9 (significantly for each group). Females scored significantly higher than males on an overall basis, although

the difference was only .2 of a standard deviation. Contrasts across grades were performed separately for each sex group because the heterogeniety condition was present. The males scored at essentially the same level at grades 5 and 7 but dropped significantly at grade 9. The females demonstrated a significant increase in the grade 5 to 7 interval and then decreased significantly from grades 7 to 9. Most of the comparisons reflected only small differences, the largest and most consistent occurring in the grade 7-9 interval where effect size was a quarter to a third of a standard deviation. These findings suggest a slightly higher creative attitude for females and for children from middle and high SES backgrounds. There was a tendency for creative attitude scores to remain at about the same level or to increase between grades 5 and 7 but to display a distinct decrease from grade 7 to 9.

A significant SES main effect was obtained for VOCATTD and the progressively larger means observed across SES levels were each significant. Each pairwise contrast for grade levels was also significant, demonstrating a strong trend of higher scores across time. Females scored significantly higher than males; however, the difference was only .12 of a standard deviation. Due to the heterogeneity of variance-covariance matrices individual grade level comparisons were computed. The trend of higher mean scores across grade levels was strongly evident for both males and females. All groups exhibited their greatest gain during the grade 5-7 period where differences were about .6 to .7 of a standard deviation. These results suggest that a greater maturity of vocational attitudes appears to be present for children from higher SES strata and for females. Likewise, an increased maturity of response was evident as grade level increased, a result which should be anticipated since the original development of the scale was based on a theory of vocational maturity which presumed an increase in positive responding with age.

All statistical analyses revealed similar results for PREPCHNG. The main effects for SES and sex were nonsignificant. The variance-covariance matrices were homogeneous in both AOV's. Only the grade main effect was significant for PREPCHNG. The grade 7 mean was found to be significantly greater, although not substantively, than the mean at grade 5 and although a slight decrease in the mean score was observed from grades 7 to 9, the difference was not significant. These findings indicate that a willingness to express acceptance of change tended to increase slightly from grades 5 to 7 and then remained at about the same level. Socioeconomic and sex differences were not observed on this instrument.

Relationship with Achievement

Included in the instrument battery given at gredes 5 and 7, but not at grade 9, was an achievement test comprised of 60 items, divided equally into verbal and mathematics sections. The 30 item verbal section consisted entirely of verbal analogies with KR-20 estimates of internal consistency hovering around .75. A content analysis of the 30 item mathematics section revealed the following breakdown: number concept (7 items), arithmetic skills (18 items), measurement and conversion (2 items), geometry (2 items) and algebraic notions (6 items). Certain items represent more than one content area, which accounts for the number of items within parentheses summing to more than 30. Averaging about .75 were KR-20 reliability estimates for the math section. For purposes of analysis the composite score was used as an overall index of achievement.

Although these sections were part of the grade 5 instrument package they were judged to be appropriate for use at grade 7. As expected, mean scores increased from grade 5 to grade 7, but there was still adequate ceiling on the test. For the 60 item composite the observed grade 5 and 7 means were

33.46 and 43.40, respectively. The grade 5 and 7 standard deviation of 8.89 and 8.99 were remarkably similar, indicating that the variability at grade 7 did not suffer a constriction due to a ceiling effect.

Presented in Table 12 are the correlations of the grade 7 scale scores with grade 7 composite achievement. Separate correlations are shown for each sex and socioeconomic group as well as for the total sample.

Insert Table 12 about here

The correlations presented for grade 7 are very similar to those obtained between grade 5 scale scores and grade 5 composite achievement. In general, the correlations remained at about the same magnitude. The following description of results obtained at grade 7 could also apply to those obtained at grade 5.

A comparison of the correlations obtained for socioeconomic groups failed to produce a consistent picture of higher relationships for any group. Nor did any of the correlations differ significantly. Correlations for the female group were somewhat higher than those obtained for males, but only one, VOCATTD was significant ($z = 2.66$, $p < .01$). Regarding the total sample correlations as representative of the relationships observed, a pattern of low positive relationships were obtained for most noncognitive areas. The relationship found between SELFCON and achievement is consistent with many studies. Interestingly, the correlation of ATTDSCHL and achievement was only .10. The largest relationship was obtained with HEALTH as one should expect since it is also an achievement measure. Maturity of vocational attitudes had the second highest correlation with verbal-math achievement.

DISCUSSION

Eight student outcomes, seven attitudinal and one cognitive were studied longitudinally with particular concern for SES and sex differences in internal consistency, stability, mean scores and relationship with achievement. The impact of SES was evident throughout the data. Differences due to sex were fewer in number and generally of a much smaller magnitude than those observed for SES.

Generally, internal consistency was found to increase with grade level and there was some tendency for higher SES groups to exhibit slightly higher coefficient alpha's in some areas.

Stability coefficients were of a generally low magnitude, ranging from about .50 to .60 for SELFCON and HEALTH to about .20 and .30 for UNDRSTND. There was a tendency for the two-year stability coefficients for the grade 7-9 period to be about six points higher than those observed during the grade 5-7 interval. This finding is consistent with the general tendency for internal consistency to increase with grade level. These results conform to the developmental trend typically observed during this age range. Although females exhibited slightly higher stability coefficients than males in 19 of 24 instances only one was statistically greater. Significantly higher stability across SES levels failed to materialize into any definite pattern. Only 5 of 72 possible comparisons reached statistical significance.

Mean scores tended to increase as SES level increased for SELFCON, UNDRSTND, CITZNSHP, HEALTH, CREATVTY and VOCATTD. Females displayed higher mean scores than males on ATTDSCHL, CITZNSHP, HEALTH, CREATVTY, and VOCATTD, although the magnitude of these differences tended to be small.

The pattern of change across time tended to be consistent across SES and sex groups. Mean scores tended to increase significantly across time for SELFCON, UNDRSTND, HEALTH, VOCATTD and PREPCHNG. A significant decrease in mean scores was observed for ATTDSCHL and a significant decrement from grade 7 to 9 for CITZNSHP and CREATVTY.

Correlations between 7th grade verbal/math achievement and the grade 7 attitudinal measures were characteristically low positive, ranging from zero to .50, with a median of .29. Somewhat lower than anticipated was the correlation of .61 between verbal/math achievement and HEALTH, which was also an achievement measure. SES difference in correlations failed to materialize. Although the females exhibited slightly higher correlations than the males, only one relationship was found to differ significantly.

Most of the attitude scales in the battery were developed by Department of Education staff for the purpose of program assessment and do not have an extensive body of supportive research to compare present results with. Comparisons can be made for two of the scales, however. As indicated earlier SELFCON was a modification of the SEI Coopersmith (1967) and VOCATTD was composed of 39 items from the Crites (1971) VDI attitude scale.

For SELFCON the total sample stability coefficients of .52 (grade 5-7), .41 (grade 5-9) and .58 (grade 7-9) are all considerably lower than the .70 (grade 5-8) figure reported by Coopersmith on a sample of 56 children. With the SEI, Trowbridge (1972) found low SES children to have higher self esteem scores than high SES children. By contrast, the present study found self esteem to increase linearly with SES. Trowbridge also found that scores decreased from grade 3 to grade 8 whereas the present study found that scores

increased. This discrepancy may be due, at least in part, to methodological differences. The Trowbridge study was cross-sectional as opposed to longitudinal. The correlation of .29 between SELFCON and achievement compares closely with the .31 found by Campbell (cited by Wylie, 1974) with the SEI and the Iowa Test of Basic Skills.

The present study found VOCATTD internal consistency to be .78 at both grade 7 and 9 which is higher than the .70 and .65 obtained by Crites' normative sample at the same grade levels. Crites reports a one-year stability of .71 for an unspecified group while a coefficient of .53 was obtained for the grade 7-9 span for VOCATTD. The present investigation found VOCATTD to be related to SES. Some evidence of greater vocational maturity for higher SES students may be found in the studies cited by Crites. Although vocational maturity was found to be related to SES in only one study, one could regard the studies contrasting students in vocational and academic curriculums as indicative of SES effects. That is, students selecting academic programs tend, as a group, to come from higher SES backgrounds than those choosing a vocational program. In three studies cited by Crites it was consistently found that college-bound students exhibited greater vocational maturity than the vocational students. Vocational maturity was also found to be related to aptitude and achievement scores. Crites noted that correlations ranged from .20 to the mid .40's. Comparing favorably with these results was the correlation of .50 between VOCATTD and 7th grade verbal/math achievement.

Longitudinal information is generally rare and much sought after in education, particularly where non-cognitive measures are concerned. It is hoped that the data presented in this study will be useful in describing the possible developmental trend of a variety of student outcomes.

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TABLE 1

Comparability of Longitudinal Sample with 1969 Norm Sample in Terms of Total Scale Scores

	Norm Sample (1969)			Longitudinal Sample (1969 Data)		
	N	Mean	SD	N	Mean	SD
SELFCON	19435	87.02	8.09	548	87.88	8.00
UNDRSTND	19405	32.48	5.34	555	32.87	5.43
ATTDSCHL	19444	58.82	8.85	540	59.97	9.14
CITZNSHP	19372	160.83	21.01	540	163.80	21.59
HEALTH	19301	28.22	6.51	533	28.80	6.64
CREATVTY	19465	138.16	15.53	542	140.61	16.45
VOCATTD	19487	59.90	5.15	540	60.26	5.08
PREPCHNG	19414	100.99	16.07	548	102.65	15.91

TABLE 2

Internal Consistency for Each Scale
by Sex, Socioeconomic Level and Grade Level

	MALE			FEMALE			TOTAL GROUP		
	Gr. 5	Gr. 7	Gr. 9	Gr. 5	Gr. 7	Gr. 9	Gr. 5	Gr. 7	Gr. 9
SELFCON	.84	.86	.88	.86	.88	.89	.85	.87	.88
UNDRSTND	.76	.79	.75	.76	.78	.85	.77	.79	.81
ATTDSCHL	.71	.80	.82	.74	.75	.81	.73	.79	.82
CITZNSHP	.88	.90	.90	.85	.89	.91	.87	.90	.91
HEALTH	.81	.83	.81	.77	.78	.74	.79	.81	.78
CREATVTY	.79	.81	.83	.81	.81	.81	.80	.82	.83
VOCATTD	.65	.74	.77	.74	.81	.79	.70	.78	.78
PREPCHNG	.75	.77	.71	.78	.74	.64	.76	.75	.68

	LOW SES			MIDDLE SES			HIGH SES		
	Gr. 5	Gr. 7	Gr. 9	Gr. 5	Gr. 7	Gr. 9	Gr. 5	Gr. 7	Gr. 9
SELFCON	.83	.85	.88	.84	.87	.88	.87	.88	.87
UNDRSTND	.74	.74	.78	.78	.81	.82	.79	.79	.82
ATTDSCHL	.72	.78	.82	.69	.74	.79	.78	.84	.84
CITZNSHP	.84	.90	.91	.87	.89	.90	.88	.91	.92
HEALTH	.79	.81	.80	.80	.80	.75	.71	.74	.76
CREATVTY	.76	.82	.80	.79	.81	.82	.84	.83	.87
VOCATTD	.65	.70	.76	.70	.78	.79	.69	.80	.78
PREPCHNG	.77	.74	.72	.77	.78	.68	.76	.73	.62

TABLE 3

Summary of Across Time Correlations
Within Sex Groups and for the Total Sample

	Scale	N	r_{57}	r_{59}	r_{79}
MALE	SELFCON	257	.53	.48	.58
	UNDRSTND	261	.19	.24	.31
	ATTDSCHL	254	.30	.33	.41
	CITZNSHP	255	.42	.33	.46
	HEALTH	257	.50	.38	.50
	CREATVTY	258	.46	.33	.46
	VOCATTD	259	.43	.36	.49
	PREPCHNG	258	.26	.11	.41
FEMALE	SELFCON	274	.52	.36	.59
	UNDRSTND	278	.27	.28	.33
	ATTDSCHL	269	.39	.25	.39
	CITZNSHP	273	.44	.38	.53
	HEALTH	261	.63	.46	.55
	CREATVTY	274	.51	.45	.53
	VOCATTD	271	.50	.41	.55
	PREPCHNG	271	.29	.21	.35
TOTAL SAMPLE	SELFCON	531	.52	.41	.58
	UNDRSTND	539	.22	.26	.32
	ATTDSCHL	523	.35	.30	.41
	CITZNSHP	528	.44	.37	.51
	HEALTH	518	.56	.42	.53
	CREATVTY	532	.49	.39	.50
	VOCATTD	530	.47	.38	.53
	PREPCHNG	529	.27	.16	.39

TABLE 4

Summary of Across Time Correlations
Within Socioeconomic Groups

	Scale	N	r_{57}	r_{59}	r_{79}
	SELFCON	171	.42	.34	.62
	UNDRSTND	173	.22	.26	.32
	ATTDSCHL	160	.34	.19	.40
LOW	CITZNSHP	164	.41	.37	.57
SES	HEALTH	167	.47	.37	.50
	CREATVTY	166	.46	.42	.54
	VOCATTD	163	.34	.19	.46
	PREPCHNG	170	.30	.20	.45
	SELFCON	232	.55	.41	.56
	UNDRSTND	236	.15	.27	.37
	ATTDSCHL	232	.30	.28	.34
MID	CITZNSHP	230	.40	.37	.49
SES	HEALTH	224	.56	.45	.56
	CREATVTY	235	.48	.46	.49
	VOCATTD	236	.50	.43	.55
	PREPCHNG	232	.31	.18	.36
	SELFCON	128	.55	.43	.51
	UNDRSTND	130	.33	.13	.14
	ATTDSCHL	131	.45	.44	.50
HIGH	CITZNSHP	134	.51	.34	.44
SES	HEALTH	127	.55	.32	.43
	CREATVTY	131	.51	.25	.47
	VOCATTD	131	.45	.42	.46
	PREPCHNG	127	.19	.08	.34

TABLE 5

Summary of Means and Standard Deviations Across Grade Levels for Socioeconomic Groups

Scale/SES	N	Grade 5 Mean	Grade 5 SD	Grade 7 Mean	Grade 7 SD	Grade 9 Mean	Grade 9 SD	Overall Mean	Overall SD
SELFCON - L	171	86.30	7.76	87.57	8.14	88.33	8.69	87.40	11.39
- M	232	88.25	7.76	88.75	8.15	90.55	8.25	89.18	11.43
- H	128	89.82	8.36	91.56	8.34	92.34	7.65	91.24	11.47
Overall	531	88.00	7.91	89.05	8.19	90.27	8.26		
UNDRSTND - L	173	31.92	5.50	33.76	4.44	34.78	3.84	33.49	5.70
- M	236	32.79	5.53	34.26	4.83	35.03	4.04	34.03	5.90
- H	130	34.47	4.57	35.54	4.12	36.02	3.46	35.34	4.84
Overall	539	32.91	5.31	34.41	4.54	35.19	3.84		
ATTDSCHL - L	160	59.44	9.12	58.43	9.75	54.44	9.75	57.44	12.16
- M	232	60.35	8.75	57.27	8.60	54.75	9.12	57.46	11.19
- H	131	60.22	9.73	58.30	10.62	55.83	10.29	58.12	14.17
Overall	523	60.04	9.11	57.88	9.49	54.93	9.61		
CITZNSHP - L	164	160.49	20.94	162.00	22.60	154.47	23.08	158.99	30.71
- M	230	163.93	21.50	163.26	21.83	158.17	21.62	161.79	29.37
- H	134	167.98	22.41	169.84	23.56	162.13	23.10	166.65	31.42
Overall	528	163.89	21.56	164.54	22.52	158.02	22.46		
HEALTH - L	167	27.77	6.58	31.71	6.24	35.59	5.77	31.69	8.52
- M	224	28.17	6.69	32.86	6.38	36.82	5.15	32.62	8.72
- H	127	31.81	5.44	35.83	5.22	38.26	5.04	35.30	7.14
Overall	518	28.93	6.37	33.22	6.07	36.78	5.33		
CREATVTY - L	166	136.95	15.01	140.42	15.42	135.97	13.73	137.78	20.53
- M	235	141.26	15.74	142.54	14.34	138.06	14.10	140.62	20.60
- H	131	144.65	18.56	144.71	16.08	140.12	16.67	143.16	23.03
Overall	532	140.75	16.26	142.41	15.12	137.92	14.66		
VOCATTD - L	163	59.12	5.11	62.31	5.13	64.01	5.58	61.81	6.80
- M	236	59.94	5.05	63.86	5.71	65.23	5.68	63.03	7.74
- H	131	62.28	4.59	66.06	5.88	66.84	5.31	65.06	7.25
Overall	530	60.26	4.96	63.93	5.58	65.25	5.56		
PREPCHNG - L	170	102.96	16.04	107.72	14.97	105.27	13.46	105.31	18.91
- M	232	102.02	15.37	106.27	14.98	106.40	12.32	104.90	17.85
- H	127	104.09	16.00	105.59	14.07	104.14	11.63	104.61	16.47
Overall	529	102.82	15.74	106.57	14.76	105.49	12.54		

TABLE 6

Summary of Means and Standard Deviations Across
Grade Levels for Male and Female Groups

Scale/SEX	N	Grade 5 Mean	Grade 5 SD	Grade 7 Mean	Grade 7 SD	Grade 9 Mean	Grade 9 SD	Overall Mean	Overall SD
SELFCON - M	257	87.90	7.89	89.21	8.31	91.15	8.15	89.42	11.65
- F	274	88.09	8.12	88.90	8.33	89.44	8.52	88.91	11.69
Overall	531	88.00	8.01	89.05	8.32	90.27	8.34		
UNDRSTND - M	261	32.82	5.58	34.20	5.14	34.47	3.87	33.83	5.94
- F	278	33.00	5.20	34.60	3.98	35.86	3.75	34.49	5.45
Overall	539	32.91	5.39	34.41	4.58	35.19	3.80		
ATTDSCHL - M	254	58.74	9.13	56.19	10.25	54.17	9.97	56.37	12.73
- F	269	61.26	8.93	59.48	8.43	55.65	9.22	58.80	11.49
Overall	523	60.04	9.03	57.88	9.36	54.93	9.59		
CITZNSHP - M	255	160.37	23.45	159.33	23.78	152.88	22.48	157.73	31.20
- F	273	167.83	19.41	168.84	20.76	162.83	21.67	166.28	28.41
Overall	528	163.89	21.45	164.54	22.27	158.02	22.06		
HEALTH - M	257	28.51	6.94	32.52	6.64	36.13	5.99	32.38	9.05
- F	261	29.35	6.17	33.91	5.79	37.42	4.70	33.56	8.07
Overall	518	28.93	6.56	33.22	6.22	36.78	5.38		
CREATVTY - M	258	139.36	16.87	139.85	15.72	135.43	15.53	138.21	21.72
- F	274	142.06	16.04	144.82	14.25	140.25	13.53	142.38	20.62
Overall	532	140.75	16.45	142.41	14.98	137.92	14.53		
VOCATTD - M	259	60.23	4.64	63.37	5.43	64.40	5.56	62.67	7.10
- F	271	60.30	5.50	64.46	5.98	66.07	5.62	63.61	8.02
Overall	530	60.26	5.10	63.93	5.72	65.25	5.59		
PREPCHNG - M	258	103.62	15.07	107.53	14.85	106.94	13.19	106.03	17.71
- F	271	102.05	16.33	105.65	14.64	104.11	11.76	103.94	17.85
Overall	529	102.82	15.73	106.57	14.74	105.49	12.48		

TABLE 7

Summary of F-Ratios Obtained in Repeated Measures Analysis of Variance: Socioeconomic Groups

Scale	SES	Grade	SES x Grade
SELFCON	12.42*	20.29*	0.73
UNDRSTND	12.65*	44.61*	1.01
ATTDSCHL	0.44	60.12*	1.14
CITZNSHP	7.15*	24.40*	0.46
HEALTH	21.58*	431.66*	3.03
CREATVTY	7.17*	21.25*	1.22
VOCATTD	21.56*	215.96*	0.83
PREPCHNG	0.18	13.05*	1.72

*Denotes significance beyond .01 level (familywise error rate).

TABLE 8

Summary of Independent t' Tests and Effect Size
Following a Significant Socioeconomic Main Effect

Scale/Group	Low-Middle t'	df'	d	Low-High t'	df'	d	Middle-High t'	df'	d
SELFCON	2.69*	1105	.16	4.97*	822	.34	2.82*	788	.18
UNDRSTND	1.62	1138	.09	5.30*	893	.35	3.98*	940	.24
CITZNSHP	1.57	1029	.09	3.66*	849	.25	2.52	793	.16
HEALTH	1.83	1091	.11	6.83*	872	.45	5.39*	921	.33
CREATVTY	2.84*	1072	.14	3.63*	792	.25	1.82	738	.12
VOCATTD	2.84*	1129	.17	6.80*	815	.46	4.38*	856	.27

*Denotes significance beyond .01 level (familywise error rate).

TABLE 9

Summary of Dependent t Tests and Effect Size Estimates
Following A Significant Grade Level Main Effect

Scale/Group	df	Pairwise Contrasts Between Grade Levels					
		Grade 5-7		Grade 5-9		Grade 7-9	
SELFCON - T	530	3.03*	.13	5.84*	.26	3.67*	.16
UNDRSTND - L	172	3.86*	.29	6.46*	.49	2.76*	.21
UNDRSTND - M	235	3.34*	.22	5.84*	.38	2.34*	.15
UNDRSTND - H	129	2.42	.21	3.29*	.29	1.09	.10
ATTDSCHL - T	523	4.61*	.20	10.92*	.46	6.31*	.28
CITZNSHP - T	527	0.63	.03	5.71*	.24	6.34*	.29
HEALTH - T	518	16.11*	.73	27.50*	1.23	14.26*	.64
CREATVTY - L	165	2.83*	.22	0.81	.06	4.08*	.32
CREATVTY - M	234	1.27	.08	3.15*	.21	4.78*	.31
CREATVTY - H	130	0.04	.00	2.40	.21	3.10*	.27
VOCATTD - T	529	15.05*	.67	19.12*	.85	5.49*	.24
PREPCHNG - T	528	4.70*	.20	3.34*	.14	1.63	.07

*Denotes significance beyond .01 level (familywise error rate).

TABLE 10

Summary of F-Ratios Obtained in Repeated Measures Analysis of Variance: Sex Groups

Scale	Sex	Grade	Sex x Grade
SELFCON	1.10	20.42*	3.84
UNDRSTND	5.37	44.82*	3.54
ATTDSCHL	15.82*	60.19*	1.89
CITZNSHP	32.61*	24.46*	1.22
HEALTH	7.31*	427.95*	0.58
CREATVTY	15.43*	21.26*	1.66
VOCATTD	6.08*	217.89*	5.38*
PREPCHNG	5.49	13.00*	0.37

*Denotes significance beyond .01 level (familywise error rate).

TABLE 11

Summary of Dependent t Tests and Effect Size Estimates
Following A Significant Grade Level Main Effect

Scale/Group	df	Pairwise Contrasts Between Grade Levels					
		Grade 5-7		Grade 5-9		Grade 7-9	
UNDRSTND - M	260	3.26*	.20	4.44*	.28	0.79	.05
UNDRSTND - F	277	4.75*	.28	8.70*	.52	4.71*	.28
ATTDSCHL - M	254	3.53*	.22	6.56*	.41	2.93*	.18
ATTDSCHL - F	268	3.03*	.19	8.30*	.51	6.45*	.39
CITZNSHP - M	254	0.28	.04	4.50*	.28	4.66*	.27
CITZNSHP - F	272	1.29	.05	3.13*	.22	4.80*	.29
HEALTH - M	256	9.43*	.59	16.89*	1.05	9.17*	.57
HEALTH - F	261	14.19*	.88	22.54*	1.40	11.22*	.69
CREATVTY - M	257	0.46	.03	3.36*	.21	4.35*	.27
CREATVTY - F	273	3.04*	.18	1.91	.12	5.61*	.34
VOCATTD - M	258	9.32*	.58	11.50*	.72	2.95*	.19
VOCATTD -F	270	11.95*	.72	15.66*	.96	4.80*	.29

*Denotes significance beyond .01 level (familywise error rate).

TABLE 12

Correlations Between EQA Scales and
Composite Achievement at Grade 7

Scale	SEX		SOCIOECONOMIC GROUPS			Total
	Males	Females	Low	Middle	High	Sample
SELFCON	.26	.31	.24	.27	.18	.29
UNDRSTND	.18	.29	.27	.18	.15	.23
ATTDSCHL	-.02	.23	.11	.12	-.01	.10
CITZNSHP	.33	.41	.35	.34	.24	.35
HEALTH	.61	.64	.57	.61	.57	.61
CREATVTY	.23	.38	.28	.31	.19	.29
VOCATTD	.42	.58	.46	.52	.37	.50
PREPCHNG	-.02	.01	.08	-.04	.01	.00